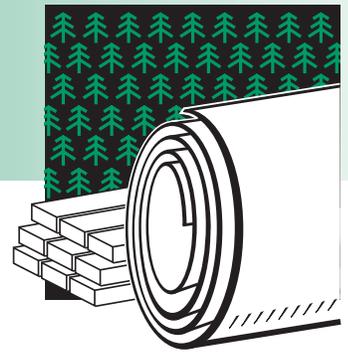


FOREST PRODUCTS

Success Story



PALLET PRODUCTION USING POSTCONSUMER WASTEPAPER

Use of Recycled Paper Shown Viable in Several Products

Benefits

- ◆ Through 2000, the cumulative energy savings have been over 2 billion Btu
- ◆ Reduced wastewater by 35% and air pollution by nearly 75%
- ◆ Reduced virgin wood requirements for producing pallets and other paperboard products
- ◆ Reduced water requirements by 50%
- ◆ Decreased energy requirements by 60%

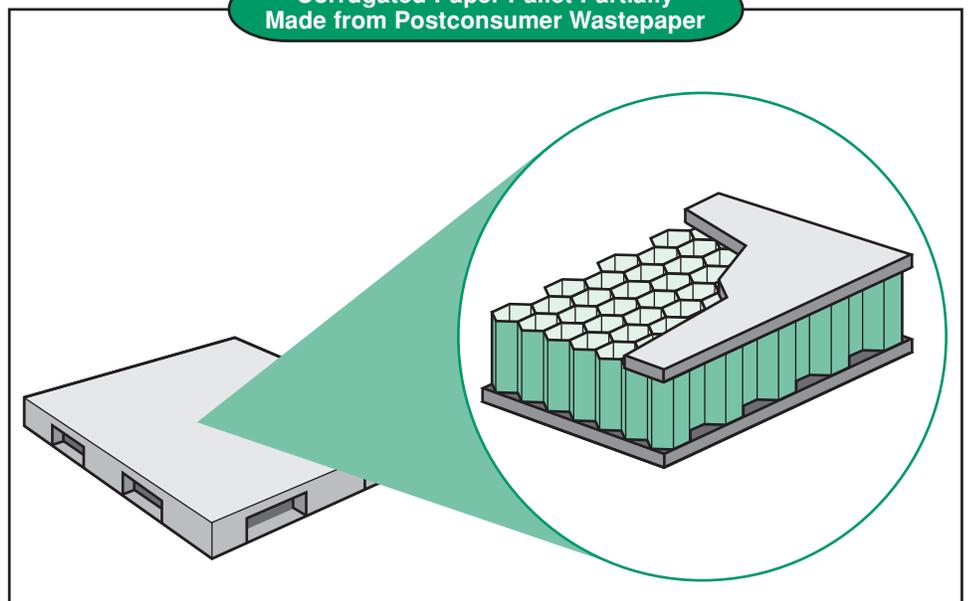
Applications

The original application was for the production of shipping pallets for freight transport. Additionally this process can be used to manufacture roofing felt and honeycomb structures for use in housing construction.

Each year the United States produces about half a billion shipping pallets, most of which are made of virgin wood. Harvesting the wood to manufacture wood pallets creates environmental problems, and disposing or recycling the pallets is difficult and expensive. With rising lumber prices, diminishing supplies, and a growing concern about waste disposal, Damage Prevention Products Corp. (DPPC) recognized the need for a new pallet product that would help protect the country's lumber resources and the environment.

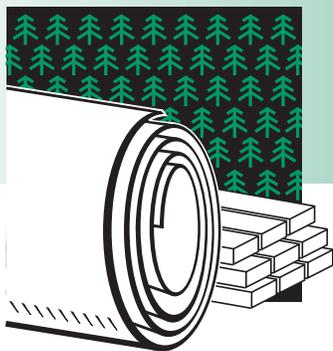
DPPC decided to pursue the idea of paper pallets. In the United States, corrugated paper pallets made with virgin paper are not a new technology. However, DPPC decided to develop a paper pallet partially made from postconsumer wastepaper (PCW). Industries in Japan, Korea, Taiwan, and other countries typically produce paper products composed of at least 50% recycled mixed-paper waste. Anticipating the effects of new mandates by the state of California to reduce waste, DPPC wanted to demonstrate that a reliable corrugated paper pallet could be manufactured from recycled paper. DPPC decided to demonstrate and produce this new product at its Benicia, California plant.

Corrugated Paper Pallet Partially Made from Postconsumer Wastepaper



FOREST PRODUCTS

Success Story



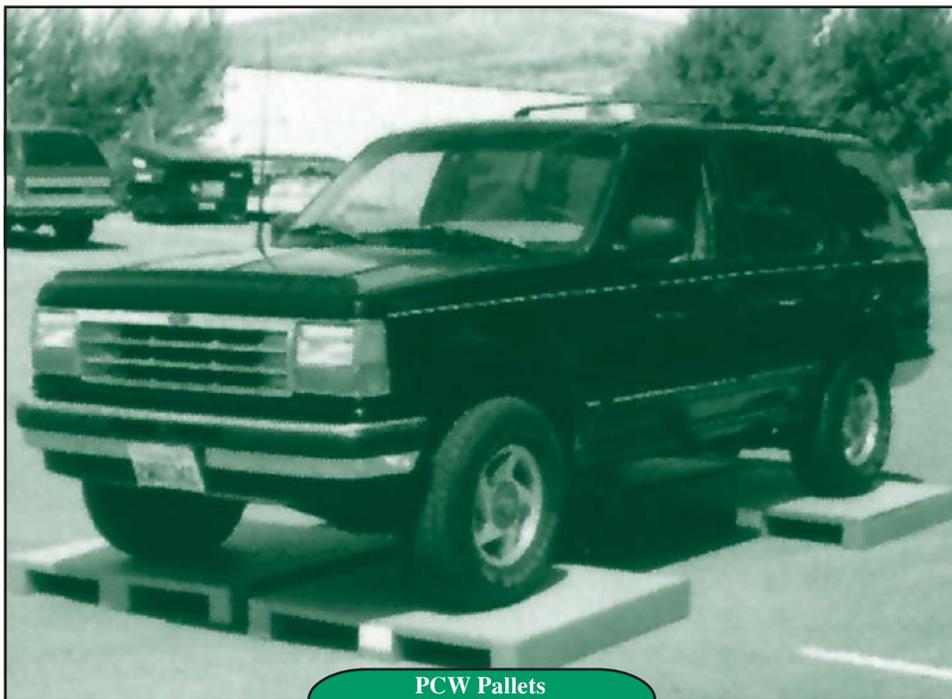
NICE³ Demonstration Proves Product Viability

In March 1992 DPPC began producing corrugated paper pallets from recycled paper. In 1993 it received a \$100,000 grant under the U.S. Department of Energy's NICE³ (National Industrial Competitiveness through Energy, Environment, and Economics) Program and funding from the California Integrated Waste Management Board and the California Energy Commission to demonstrate the commercial viability of its recycled paper pallets.

Under the NICE³ grant, DPPC successfully completed a series of tests and demonstrations showing that the innovative pallets perform well. Harry Woods of DPPC explained how the NICE³ grant was just what the company needed to enter this new market: "Under this program, we completed the tests necessary to demonstrate that our product was equivalent in quality and performance to conventional pallets."

"Under this program, we completed the tests necessary to demonstrate that our product was equivalent in quality and performance to conventional pallets."

**– Harry Woods
DPPC**



**PCW Pallets
Proven to be Strong**



OFFICE OF INDUSTRIAL TECHNOLOGIES

ENERGY EFFICIENCY AND
RENEWABLE ENERGY
U.S. DEPARTMENT OF ENERGY

FOREST PRODUCTS

Success Story



Project Partners

◆ Damage Prevention Products Corp.
Benicia, CA

◆ California Integrated Waste
Management Board
Sacramento, CA

Benefits of Using PCW in Pallets

DPPC successfully replaced 40% of the virgin material used in corrugated paper pallets with PCW or mixed waste—magazines, newspapers, and linerboard. The actual PCW makeup percentage in the pallets produced is a function of the feedstock price and availability. According to Frank DiBerardino of DPPC, the percentage of PCW in the pallets varies between 40% and 100%, but averages between 50% and 60%. To be conservative, and because this program evaluation focused on energy savings associated with the 40% PCW pallets, the energy savings presented are based on the 40% PCW assumption.

The energy savings from manufacturing the 40% recycled wastepaper pallets is 15,000 Btu/ pallet or 16% less than that required to manufacture pallets from corrugated virgin paper. For a plant producing 25,000 pallets each year, the annual energy savings would be 375 million Btu. Additional energy is saved by reducing the need to harvest and process raw timber.

Using recycled paper pallets provides more than energy savings for producers and users. Reducing the need to harvest and process raw timber not only saves energy but decreases the environmental impacts that affect water and air quality and wastewater production during logging and lumber processing. Even without including energy and waste disposal cost savings, production costs also are estimated to decrease by over one-third compared with the cost of manufacturing pallets from virgin paper. Shipping costs are also reduced because the paper pallets weigh only about one-third the weight of standard wood pallets.



Pallet Production Commercialization

In early phases of the project, DPPC sold the pallets to Tri Valley Growers and Pacific Grain in California; Design Packaging Concepts in Denver; and Mitsui & Co., Ltd. in Japan. These companies provided early feedback that helped verify product performance. The unit at DPPC's Benicia plant produces between 2,000 to 20,000 recycled paper pallets each year depending on the pallet demand that is affected by local economic factors. DPPC has successfully licensed this technology to two firms, one in Japan and one in Taiwan.

In addition to pallets, potential applications exist for using recycled paper and paperboard products in the housing market as honeycomb-core material used in prefabricated panels for modular homes. The state of California expressed an interest in transferring the production technology to idle plants in inner-city areas; however, this effort has not yet begun.

INDUSTRY OF THE FUTURE — FOREST PRODUCTS

*Through OIT's Industries of the Future initiative, the American Forest and Paper Association, on behalf of the forest products industry, has partnered with the U.S. Department of Energy (DOE) to spur technological innovations that will reduce energy consumption, pollution, and production costs. In November 1994, the industry outlined its vision for maintaining and building its competitive position in the world market in the document, **AGENDA 2020: A Technology Vision and Research Agenda for America's Forest, Wood & Paper Industry.***

OIT Forest Products Team Leader: Valri Robinson (202) 586-0937.



NICE³ – National Industrial Competitiveness through Energy, Environment, and Economics:
An innovative, cost-sharing program to promote energy efficiency, clean production, and economic competitiveness in industry. This grant program provides funding to state and industry partnerships for projects that demonstrate advances in energy efficiency and clean production technologies. Awardees receive a one-time grant of up to \$525,000. Grants fund up to 50% of total project cost for up to 3 years.

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Order # NICE³ FP-5
October 2001